

# The Diagnosis of Parkinsonism and the Significance of Biosensors and Biomarkers

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## Parkinson's disease biosensors

Parkinsonism presents a diagnostic challenge due to its heterogeneous clinical manifestations, which often overlap with other neurological conditions. However, a comprehensive evaluation led to the diagnosis of Vascular Parkinsonism (VP) based on clinical findings, neuroimaging and response to treatment. The article highlights the importance of a thorough differential diagnosis in Parkinsonism and underscores the role of neuroimaging in distinguishing between idiopathic PD and secondary parkinsonian syndromes.

Parkinsonism encompasses a spectrum of neurological disorders characterized by motor symptoms such as bradykinesia, rigidity, tremor and postural instability. Parkinson's Disease (PD) represents the most common form of parkinsonism, accounting for approximately 85% of cases. However, numerous other conditions, including Vascular Parkinsonism (VP), Multiple System Atrophy (MSA) and Progressive Supranuclear Palsy (PSP) can present with similar clinical features, posing diagnostic challenges for clinicians. Lewy pathology which is caused by the aggregation of  $\alpha$ -synuclein is a pathological sign of Parkinson's Disease (PD). The Lewy pathology refers to abnormal protein deposits primarily composed of alpha-synuclein in the brain. These deposits called Lewy bodies and Lewy neurites, are characteristic features of neurodegenerative disorders like Parkinson's Disease (PD) and Dementia with Lewy Bodies (DLB).

## Advancement diagnosis in Parkinson's disease

Recent years have seen advancements in the optimization of the Parkinson's disease diagnosis procedure notably in the identification of fluid biomarkers. They disrupt normal cellular function, impairing communication between nerve cells and leading to the progressive decline of cognitive and motor abilities. Symptoms include movement difficulties, cognitive impairment, visual hallucinations and fluctuations in alertness. Understanding Lewy pathology is for diagnosing and developing treatments for these debilitating conditions.  $\alpha$ -synuclein's position in pre-synaptic nerve terminals implies that it may play a significant role in vesicle trafficking in nerve terminals despite the fact that its normal function is still little understood.

Most of the studies were able to detect and quantify very low levels of  $\alpha$ -synuclein-related biomarkers attaining commercial availability [1].